N THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): Sadanand V. Deshpande, et al.

Examiner: Wojciechowicz, Edward J.

Serial No:

10/751,831

Docket:

FIS920030078US2 (16422A)

Filed:

January 5, 2004

Art Unit:

2815

Dated:

November 15, 2004

For:

STI STRESS MODIFICATION BY NITROGEN PLASMA TREATMENT FOR

IMPROVING PERFORMANE IN SMALL WIDTH DEVICES

Commissioner for Patents P. O. Box 1450 Alexandria, VA 23313-1450

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

Sir:

Pursuant to 37 C.F.R. §§1.56, 1.97 and 1.98, applicants submit the following references which applicants believe may be material to the above-identified patent application. A copy of the references which applicants wish to make of record in this case is enclosed herein for the Examiner's convenience along with a listing on Form PTO-1449 attached.

- 1. U.S. Patent No. 3,602,841, dated August 31, 1971, issued to McGroddy;
- 2. U.S. Patent No. 4,655,415, dated May 12, 1987, issued to Esaki, et al.;
- 3. U.S. Patent No. 4,853,076, dated August 1, 1989, issued to Tsaur, et al.;

CERTIFICATE OF MAILING UNDER 37 C.F.R. §1.8(a)

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner of Patents and Trademarks, P.O. Box 1450, Alexandria, VA 22313-1450 on the date set forth below.

Dated: November 15, 2004

Leslie 8. Sziwos, Ph.D.

- 4. U.S. Patent No. 4,855,245, dated August 8, 1989, issued to Neppl, et al.;
- 5. U.S. Patent No. 4,952,524, dated August 28, 1990, issued to Lee, et al.;
- 6. U.S. Patent No. 4,958,213, dated September 18, 1990, issued to Eklund, et al.;
- 7. U.S. Patent No. 5,006,913, dated April 9, 1991, issued to Sugahara, et al.;
- 8. U.S. Patent No. 5,060,030, dated October 22, 1991, issued to Hoke;
- 9. U.S. Patent No. 5,081,513, dated January 14, 1992, issued to Jackson, et al.;
- 10. U.S. Patent No. 5,108,843, dated April 28, 1992, issued to Ohtaka, et al.;
- 11. U.S. Patent No. 5,134,085, dated July 28, 1992, issued to Gilgen, et al.;
- 12. U.S. Patent No. 5,310,446, dated May 10, 1994, issued to Konishi, et al.;
- 13. U.S. Patent No. 5,354,695, dated October 11, 1994, issued to Leedy;
- 14. U.S. Patent No. 5,371,399, dated December 6, 1994, issued to Burroughes, et al.;
- 15. U.S. Patent No. 5,391,510, dated February 21, 1995, issued to Hsu, et al.;
- 16. U.S. Patent No. 5,459,346, dated October 17, 1995, issued to Asakawa, et al.;
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- 18. U.S. Patent No. 5,557,122, dated September 17, 1996, issued to Shrivastava, et al.;

- 19. U.S. Patent No. 5,561,302, dated October 1, 1996, issued to Candelaria;
- 20. U.S. Patent No. 5,565,697, dated October 15, 1996, issued to Asakawa, et al.;
- 21. U.S. Patent No. 5,571,741, dated November 5, 1996, issued to Leedy, et al.;
- 22. U.S. Patent No. 5,592,007, dated January 7, 1997, issued to Leedy;
- 23. U.S. Patent No. 5,592,018, dated January 7, 1997, issued to Leedy;
- 24. U.S. Patent No. 5,670,798, dated September 23, 1997, issued to Schetzina;
- 25. U.S. Patent No. 5,679,965, dated October 21, 1997, issued to Schetzina;
- 26. U.S. Patent No. 5,683,934, dated November 4, 1997, issued to Candelaria;
- 27. U.S. Patent No. 5,840,593, dated November 24, 1998, issued to Leedy;
- 28. U.S. Patent No. 5,861,651, dated January 19, 1999, issued to Brasen, et al.;
- 29. U.S. Patent No. 5,880,040, dated March 9, 1999, issued to Sun, et al.;
- 30. U.S. Patent No. 5,940,736, dated August 17, 1999, issued to Brady, et al.;
- 31. U.S. Patent No. 5,946,559, dated August 31, 1999, issued to Leedy;
- 32. U.S. Patent No. 5,960,297, dated September 28, 1999, issued to Saki;
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- 44. U.S. Patent No. 6,228,694, dated May 8, 2001, issued to Doyle, et al.;
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- 47. U.S. Patent No. 6,261,964, dated July 17, 2001, issued to Wu, et al.;
- 48. U.S. Patent No. 6,265,317, dated July 24, 2001, issued to Chiu, et al.;
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- 51. U.S. Patent No. 6,284,623, dated September 4, 2001, issued to Zhang, et al.;
- 52. U.S. Patent No. 6,284,626, dated September 4, 2001, issued to Kim;

- 53. U.S. Patent No. 6,319,794, dated November 20, 2001, issued to Akatsu, et al.;
- 54. U.S. Patent No. 6,361,885, dated March 26, 2002, issued to Chou;
- 55. U.S. Patent No. 6,362,082, dated March 26, 2002, issued to Doyle, et al.;
- 56. U.S. Patent No. 6,368,931, dated April 9, 2002, issued to Kuhn, et al.;
- 57. U.S. Patent No. 6,403,486, dated June 11, 2002, issued to Lou;
- 58. U.S. Patent No. 6,403,975, dated June 11, 2002, issued to Brunner, et al.;
- 59. U.S. Patent No. 6,406,973, dated June 18, 2002, issued to Lee;
- 60. U.S. Patent No. 6,476,462, dated November 5, 2002, issued to Shimizu, et al.;
- 61. U.S. Patent No. 6,493,497, dated December 10, 2002, issued to Ramdani, et al.;
- 62. U.S. Patent No. 6,498,358, dated December 24, 2002, issued to Lach, et al.;
- 63. U.S. Patent No. 6,501,121, dated December 31, 2002, issued to Yu, et al.;
- 64. U.S. Patent No. 6,506,652, dated January 14, 2003, issued to Jan, et al.;
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- 66. U.S. Patent No. 6,521,964, dated February 18, 2003, issued to Jan, et al.;
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- 69. U.S. Patent Application Publication No. 2001/0009784 A1, dated July 26, 2001, issued to Ma, et al.;
- 70. U.S. Patent Application Publication No. 2002/0074598 A1, dated June 20, 2002, issued to Doyle, et al.;
- 71. U.S. Patent Application Publication No. 2002/0086472 A1, dated July 4, 2002, issued to Roberds, et al.;
- 72. U.S. Patent Application Publication No. 2002/0086497 A1, dated July 4, 2002, issued to Kwok;
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- 76. U.S. Patent Application Publication No. 2003/0057184 A1, dated March 27, 2003, issued to Yu, et al.;
- 77. U.S. Patent Application Publication No. 2003/0067035 A1, dated April 10, 2003, issued to Tews, et al.;
- 78. Rim, et al., "Transconductance Enhancement in Deep Submicron Strained-Si *n*-MOSFETs", International Electron Devices Meeting, 26, 8, 1, IEEE, September 1998;
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- 80. Scott, et al. "NMOS Drive Current Reduction Caused by Transistor Layout and Trench Isolation Induced Stress", International Electron Devices Meeting, 34.4.1, IEEE, September 1999;

- 81. Ootsuka, et al. "A Highly Dense, High-Performance 130nm node CMOS Technology for Large Scale System-on-a-Chip Application", International Electron Device Meeting, 23.5.1, IEEE, April 2000;
- 82. Ito, et al. "Mechanical Stress Effect of Etch-Stop Nitride and its Impact on Deep Submicron Transistor Design", International Electron Devices Meeting, 10.7.1, IEEE, April 2000;
- 83. Shimizu, et al. "Local Mechanical-Stress Control (LMC): A New Technique for CMOS-Performance Enhancement", International Electron Devices Meeting, IEEE, March 2001;
- 84. Ota, et al. "Novel Locally Strained Channel Technique for high Performance 55nm CMOS", International Electron Devices Meeting, 2.2.1, IEEE, February 2002.
- 85. Ouyang, et al. "Two-Dimensional Bandgap Engineering in a Novel Si/SiGe pMOSFETS With Enhanced Device Performance and Scalability", Microelectronics Research Center, pp 151-154, 2000 IEEE.
- 86. Sayama et al., "Effect of < Channel Direction for High Performance SCE Immune pMOSFET with Less Than 0.15um Gate Length" ULSI Development Center, pp27.5.1-27.5.4, 1999 IEEE.
- 87. European Patent Application Publication No. EPO 01/62362, 26/06/89, issued to Hasegawa, Michihiko;
- 88. European Patent Application Publication No. EP 1 174 928 A1, dated 01/23/02, issued to Hitachi Ltd.;
- 89. European Patent Application Publication No. EP 0 967 636 A2, dated 12/29/1999, issued to Rengarajan, et al.;
- 90. International Patent Application Publication No. WO 02/454156 A2, dated 06/06/2002, issued to Armstrong et al.;
- 91. International Application Publication No. WO 94/27317, dated 05/06/1993, issued to Winnerl, et al.;

In accordance with the waiver of 37 C.F.R. § 1.98 (a)(2)(i), per 1276 OG 55, August 5, 2003, applicants are not required to submit copies of the above-cited U.S. Patent references. Inasmuch as this Information Disclosure Statement is being submitted in accordance with the schedule set out in 37 C.F.R. § 1.97(b), no statement or fee is required.

Respectfully submitted

Lesle S. Szivos

Registration No. 39,394

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Customer No. 23389

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	INFORMATION DISCLOSURE CITATION				FIS920030078US2	(16422A)	Una	ssigned	signed			
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Docket Number (Optional)

Application Number

Form PTO-A820 (also form PTO-1449)

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FIS920030078US2 (16422A)

Applicant(s)
Sadanand V. Deshpande, et al.

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		5,561,302	10/01/96	Candela	ıria		CLASS SUBCLASS FILING DATE IF APPROPRIATE CLASS SUBCLASS FILING DATE IF APPROPRIATE CLASS SUBCLASS Translation YES NO Pate, Pertinent Pages, Etc.) Translation YES NO		
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		5,989,978	11/23/99	Peidous					
		6,008,126	12/28/99	Leedy					
		6,025,280	02/15/00	Brady, e	et al				
		6,046,464	04/04/00	Schetzin	a				
			U.S. PATENT	T APPLICA	TION PUBLICATIONS				
*EXAMINER INITIAL	REF	DOCUMENT NUMBER	DATE		NAME	CLASS	SUBCLASS	FILING IF APPRO	
			FORE	IGN PATEN	T DOCUMENTS				
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Form PTO-A820 (also form PTO-1449)

P09A/REV05

Form PTO-1449		EPARTMENT OF COMMERCE AND TRADEMARK OFFICE	ATTY. DOCKET NO. FIS920030078US2 (16422A)	SERIAL NO. Unassigned		
			APPLICANTS Sadanand V. Deshpande,	et al.			
	INFORMATION DISCLOSU STATEMENT BY APPLICA	NT	FILING DATE Herewith		GROUP ART UNIT Unassigned		
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		U.S. P/	ATENT DOCUMENTS				
EXAMINER INITIAL	DOCUMENT NUMBER	DATE	NAME	CLAS	SS SUBCLASS	FILIN IF APP	NG DATE ROPRIATE
	6,066,545	05/23/00	Doshi et al.				
	6,090,684	07/18/00	Ishitsuka et al.				
	6,107,143	08/22/00	Park et al.				
	6,117,722	09/12/00	Wuu et al.				
	6,165,383	12/26/00	Chou				
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^{*} EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

(Use several sheets if necessary)

Docket Number (Optional)
FIS920030078US2 (16422A)

Applicant(s)
Sadanand V. Deshpande, et al.

Filing Date

Application Number
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Group Art Unit

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			U.S	S. PATENT I	DOCUMENTS				
*EXAMINER INITIAL	REF	DOCUMENT NUMBER	DATE		NAME	CLASS	SUBCLASS	FILING IF APPRO	
		6,221,735	04/24/01	Manley,	, et al				
		6,228,694	05/08/01	Doyle, et	t al				
		6,246,095	06/12/01	Brady, e	et al				
		6,255,169	07/03/01	Li, et al					
		6,261,964	07/17/01	Wu, et a	ıl				
			U.S. PATEN	T APPLICA'	TION PUBLICATIONS				
*EXAMINER INITIAL	REF	DOCUMENT NUMBER	DATE		NAME	CLASS	SUBCLASS		
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		U.S. P/	ATENT DOCUMENTS				
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	6,265,317	07/24/01	Chiu et al.				
	6,274,444	08/14/01	Wang	7			
	6,281,532 B1 08/28/01		Doyle et al.				
	6,284,623 09/04/01		Zhang et al.				
	6,284,626	09/04/01	Kim				
	6,319,794	11/20/01	Akatsu, et al.				
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						YES	NO
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Docket Number (Optional) FIS920030078US2 (16422A)	Application Number Unassigned
Applicant(s) Sadanand V. Deshpande, et al.	
Filing Date	Group Art Unit

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			U.S	S. PATENT	DOCUMENTS				
*EXAMINER INITIAL	REF	DOCUMENT NUMBER	DATE		NAME	CLASS	SUBCLASS	FILING IF APPRO	
		6,361,885	03/26/02	Chou			·		
		6,362,082	03/26/02	Doyle, e	t al				
		6,368,931	04/09/02	Kuhn, e	t al				
		6,403,486	06/11/02	Lou					
		6,403,975	06/11/02	Brunner	r, et al				
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Form PTO-A820 (also form PTO-1449) P09A/REV05

Form PTO-144	.9 U.S.	DEPARTMENT OF COMMERCE	ATTY. DOCKET NO. FIS920030078US2 (16422A) SERIAL NO.					
		T AND TRADEMARK OFFICE		Unassigned				
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	6,406,973 B1	06/18/02	Lee					
	6,461,936	10/18/02	Von Ehrenwall					
	6,476,462 B1	11/05/02	Shimizu et al.					
	6,493,497	12/10/02	Ramdani, et al.					
	6,498,358	12/24/02	Lach, et al					
	6,501,121	12/31/02	Yu, et al.					
	6,506,652	01/14/03	Jan, et al					
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Docket Number (Optional) FIS920030078US2 (16422A)	Application Number Unassigned			
Applicant(s) Sadanand V. Deshpande, et al.				
Filing Date	Group Art Unit			

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*EXAMINER INITIAL	REF	DOCUMENT NUMBER	DATE	NAME		CLASS	SUBCLASS	FILING DATE IF APPROPRIATE	
		6,509,618	01/21/03	Jan, et al					
		6,521,964	02/18/03	Jan, et al					
		6,531,369	03/11/03	Ozkan, et al					
		6,531,740	03/11/03	Bosco, et	al				
			U.S. PATENT	Γ APPLICAT	ION PUBLICATIONS				
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